REMARKS

Claims 1-28 are pending in the application, with claims 1, 11, and 19 being the independent claims.

Applicant respectfully traverses the Examiner's rejection of each independent and dependent claim pending in the application.

Objections to the Claims

Claims 1-28 are objected to for not producing a concrete and useful result. Claims 1, 11, and 19 have been amended to incorporate the features of claims 5, 17, and 23, respectively, as suggested in the current Action. Claims 5, 17, and 23 have been canceled.

Claim 1 now recites, in part: storing the encoded information in the N least significant bits of the K-bit word, wherein the encoded information about the object comprises at least one of hash code information, lock information, garbage collection information, and reflection information.

The useful and concrete resolved achieved through the use of the method of claim 1 is the storage of at least one of the various types of information recited within the N-least significant bits of a K-bit word that already stores an address, negating the necessity for a second K-bit word in which to the store information.

The result is useful because the memory requirements for storing the N-bits of information and the address in the K-bit word are reduced from at least K+N to just K. For example, if K is an 8 bit word storing an address that contains 8 bits, and N is 4 bits of encoded of hash code information, lock information, garbage collection information, or reflection information, storing both K and N may normally require at least 8+4=12 bits. Depending on the memory architecture of the computer system, storing the 12 bits of total information may require 16 bits, as information may be stored in words that are always 8 bits. The 8-bit address would require one 8-bit word, and the 4-bits of encoded information would require a second 8-bit word.

Using the method of claim 1, the same information may be stored using only 8 bits. The 8-bit address would be aligned, such that the 4 least significant bits of the 8-bit address are 0. This may require ensuring that the target of the 8-bit address resides at a memory address whose 4-least

significant bits are 0. Because the 4 least-significant bits of the 8-bit address are 0, only the 4-most significant bits actually matter. The 4 least-significant bits can be overwritten with the 4-bits of encoded information. Both the 8-bit address and the 4-bit encoded information are stored in a single 8-bit word, saving at least 4, and more likely 8, bits of space.

The result is concrete for the same reason it is useful. Reduced memory requirement are readily detectable to system programmers, especially when dealing with systems with limited amounts of memory available to them. A system programmer for an embedded computer system that contains small amount of memory, perhaps due to size, cost, or power, or heat limitations, may be able to make better use of the available memory through the method of claim 1. For example, a system programmer may compile a code that contains 5000 objects for a system with 64Kb of memory and 8 bit words. Each object may require its own object header. Not using the method of claim 1 may result in the use of 10000 8-bit words to store the object headers for the 5000 objects, with each object requiring 2 8-bit words for its object header. The memory requirements would total 800000 bits, or 8Kb, $1/8^{th}$ of the total memory available on the system. By using the method of claim 1 this memory requirement may be cut in half, as only 1 8-bit word would be required per object header. The result is 4Kb more of free memory.

Therefore, claim 1 has at least one useful and concrete result. Claims 11 and 19 have been amended similarly to claim 1. Applicant respectfully requests that the objection to claims 1, 11, and 19 be withdrawn and claims 1, 11, and 19 be allowed.

Claims 2-4 and 6-10 are allowable for at least depending on independent claim 1.

Claims 12-16 and 18 are allowable for at least depending on independent claim 11.

Claims 20-22 and 24-28 are allowable for at least depending on independent claim 19.

Conclusion

All of the stated grounds of rejection have been properly traversed. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

Dated: October 8, 16, 2007

Respectfully submitted,

for James R. Burdett 42709

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Attachments